IN THE CLAIMS

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with <u>underlining</u> and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please **AMEND** claims in accordance with the following:

Please **CANCEL** claims 23-25 as follows.

1. (CURRENTLY AMENDED) A storage area network <u>(SAN)</u> management system comprising:

host computers, each comprising a storage area network management mechanism;

storage devices, each comprising a storage management mechanism;

switches coupled to the host computers and to the storage devices, said switches interconnecting the host computers and the storage devices, each of the switches comprising a region-setting mechanism; and

an integrated management mechanism <u>to manage the SAN according to a process comprising:</u>

~~integrating and controlling the storage area network, said integrated management mechanism including~~<u>obtaining</u> access route information of the host computers and the storage devices<u>;</u> ~~and,~~

<u>setting up a storage affinity for each host, a switch zoning affinity for each switch, and a host affinity for each storage device, as a SAN configuration setting information</u> based on said <u>obtained</u> access route information~~;~~<u>;</u>

transmitting access management information to the storage devices and <u>to</u> the storage area network management mechanisms of the host computers,<u> based upon the set storage affinity for a host computer;</u>

transmitting region information to the region-setting mechanisms of the switches, <u>based upon the set switch zoning affinity;</u> and

transmitting access limit information concerning the host computers to the storage management mechanisms of the storage devices,<u> based upon the set host affinity for a storage</u>

device.

2.　　(CURRENTLY AMENDED) The storage area network management system as in claim 1, wherein the integrated management mechanism ~~obtaining~~obtains a configuration status of the storage area network from each of the storage devices, the switches, and the host computers and stores said configuration status as the storage area network configuration settings information, and wherein at regular intervals, or when instructed by a system administrator, the integrated management mechanism gathers current configuration status of the storage area network, compares the current configuration status to the configuration settings information that was collected, and detects discrepancies based upon the comparison.

3.　　(CURRENTLY AMENDED) The storage area network management system as in claim 1, wherein the integrated management mechanism ~~obtaining~~obtains information on ~~the~~ access relationships as the access route information, from the host computer storage area network management mechanism, switches and/or the storage devices, and ~~checking the~~checks compatibility of the access ~~paths~~route information and, if the integrated management mechanism finds any access ~~paths~~routes which are not set up correctly, ~~sending out~~sends a notice about problems in a section corresponding thereto.

4.　　(CURRENTLY AMENDED) Host computers in a storage area network system (SAN) including storage devices and switches interconnecting the storage devices and the host computers, each ~~of said host computers~~host computer comprising:
　　an integrated management mechanism ~~integrating and managing~~to integrate and manage the ~~storage area network system~~SAN according to a process comprising:
　　　　~~, and establishing access information for the storage devices based on~~
　　　　obtaining access route information of the host computers and the storage devices;
　　　　setting up a storage affinity for each host, a switch zoning affinity for each switch, and a host affinity for each storage device, as a SAN configuration setting information based on said obtained access route information;
　　　　transmitting access management information ~~transmitted~~to the storage devices ~~from the integrated management mechanism~~and to storage area network management mechanisms of the host computers, based upon the set storage affinity for a host computer;

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transmitting region information to region-setting mechanisms of the switches, based upon the set switch zoning affinity; and

transmitting access limit information concerning the host computers to storage management mechanisms of the storage devices, based upon the set host affinity for a storage device.

5.   (CURRENTLY AMENDED) ~~Switches~~A switch in a storage area network system (SAN) including storage devices, host computers, and an integrated management mechanism integrating and managing the ~~storage area network system~~SAN, ~~each of said switches~~said switch comprising:

a region-setting mechanism carrying out storage device region access path settings, according to a process comprising: ~~within the storage devices~~

receiving storage device region access path information, from the integrated management mechanism, and

setting access path information to a storage device region, based on the storage device region ~~information concerning regions within the storage devices transmitted by~~access path settings received from the integrated management ~~mechanisms~~mechanism,

wherein said ~~switches interconnecting~~switch communicatively interconnects the storage devices and the host computers according to the setting of the access path information according to the integrated management mechanism.

6.   (CURRENTLY AMENDED) ~~Storage devices~~A storage device in a storage area network system (SAN) including host computers and switches that interconnect the host computers and the storage device, and an integrated management mechanism integrating and managing the storage area network system, ~~each of~~said storage ~~devices~~device comprising:

a storage management mechanism ~~establishing~~to establish conditions of access restrictions for the storage device according to a process comprising:

receiving storage device access restriction information, from the integrated management mechanism, and

establishing an access restriction condition to the storage device based on the storage device access restriction information transmitted by the integrated management mechanism~~,~~ ~~said switches interconnecting the host computers and the storage devices~~.

7.   (CURRENTLY AMENDED) An apparatus provided in a storage area network (SAN) including storage devices including storage management mechanisms, host computers including storage area network management mechanisms, and switches having a region setting mechanism and interconnecting the storage devices and the host computers, said apparatus comprising:

an integrated management ~~mechanisms integrating and managing the storage area network system,~~ mechanism to integrate and manage the SAN according to a process comprising:

obtaining access route information of the host computers and the storage devices;

setting up a storage affinity for each host, a switch zoning affinity for each switch, and a host affinity for each storage device, as a SAN configuration setting information based on said obtained access route information;

transmitting access management information to the storage devices and to the storage area network management mechanisms of the host computers, based upon the set storage affinity for a host computer;

transmitting region information to ~~a~~the switch region-setting mechanism of ~~a switch~~the switches based upon the set switch zoning affinity, and

transmitting access restriction information concerning the host computers to the storage management mechanisms of the storage devices, based upon the set host affinity for a storage device,

wherein the integrated management mechanism transmits any combination of the one or more of the access management, region information, or access limit information.

8.   (CURRENTLY AMENDED) A computer-readable medium including a program which program, when executed by a computer, causes the computer to execute the processes comprising:

integrating, managing, and controlling access relationships in a storage area network (SAN) including host computers and storage devices connected by switches, each switch having a region setting mechanism, through fiber channels, said processes further comprising:

obtaining access route information of the host computers and the storage devices;

setting up a storage affinity for each host, a switch zoning affinity for each switch, and a host affinity for each storage device, as a SAN configuration setting information based on said obtained access route information,

transmitting access management information to the storage devices and storage area network management mechanisms of the host computers based ~~on the access path information of the storage devices and the host computers,~~upon the set storage affinity for a host computer,

transmitting region information to the region setting mechanisms of the switches, based upon the set switch zoning affinity, and

transmitting access restriction information about the host computers to storage management mechanisms of the storage devices based upon the set host affinity for a storage device, ~~and~~

~~managing access relationships between the hosts and storage devices~~.

9.   (CURRENTLY AMENDED) A storage area network (SAN) system comprising:

computers as hosts comprising a storage area network management mechanism;

storage devices, each comprising a storage management mechanism;

switches interconnecting the computers and the storage devices, each of the switches comprising a region-setting mechanism; and

an integrated management device ~~integrating and managing~~to integrated and manage said ~~storage area network,~~according to a process comprising:

~~said integrated management device comprising~~obtaining access path information of the host computers and the storage devices,

setting up a storage affinity for each host, a switch zoning affinity for each switch, and a host affinity for each storage device, as a SAN configuration setting information based on said obtained access path information,

~~said integrated management device~~transmitting access management information to the storage area network management mechanism of the host computers and to the storage devices, based upon the set storage affinity for a host computer,

transmitting region information to the region setting mechanisms of the switches, based upon the set switch zoning affinity, ~~and~~

transmitting access restriction information about the host ~~computer~~computers to the storage management mechanisms of the storage devices, based upon the set host affinity for a storage device,

wherein the integrated management mechanism detecting whether fiber channel adapters mounted on the storage devices and the host computers, the host bus adapters mounted on the host computers, or the switches in said storage area network management system are replaced,

obtaining settings information following the replacement from the storage area network management mechanism of the host computers, the switch region-setting mechanism, or the storage device storage management mechanism, and

reconfiguring the access relationshipspaths to be equivalent to the access relationships priorpaths to the replacement.

10.   (CURRENTLY AMENDED) The storage area network system as in claim 9, wherein when the host bus adapter of the host computer fails and is replaced, the integrated management mechanism detects the replacement of the host bus adapter and notifies thea system administrator, wherein if the system administrator issuesupon receipt of a reconfigure command from the system administrator, the integrated management mechanism passes along the settings information from the new, replacement host bus adapter in the storage area network management mechanism of the host computer, and, using said new settings information, the integrated management mechanism configures the access relationshipspaths to be equivalent to the access relationshipspaths prior to the replacement of the host bus adapter and reconfigures the access relationshipspaths of the storage area network management mechanism, the region-setting mechanism, and the storage management mechanism.

11.   (CURRENTLY AMENDED) The storage area network system as in claim 9, wherein when the host computer fails and is replaced, the integrated management mechanism detects that the storage area network management mechanism of the host computer has no settings and notifies thea system administrator, and if the system administrator issuesupon receipt of a system administrator reconfigure command which passes along to the integrated management mechanism the settings information of the connected host bus adapter, the integrated management mechanism uses thatsettings information to reconfigure the access relationshipspaths to be equivalent to the access relationshipspaths prior to the host computer replacement and then re-establishes the access relationshipspaths of the region-setting mechanism and the storage management mechanism.

12.   (CURRENTLY AMENDED) The storage area network system as in claim 9, wherein when a switch fails and is replaced, the integrated management mechanism detects that ~~the~~ region settings information ~~that was~~ set up in the switch is not present and notifies ~~the~~a system administrator, and ~~if the system administrator issues~~ upon receipt of a reconfigure command from the system administrator, said reconfigure command ~~settings~~sets the access ~~relationships~~paths prior to the replacement in the new switch and ~~reconfiguring~~reconfigures the access ~~relationships~~paths.

13.   (CURRENTLY AMENDED) The storage area network system as in claim 9, wherein when a switch fails and is replaced, the integrated management mechanism detects that ~~the~~region settings information ~~that was~~set up in the switch is not present and the integrated management mechanism automatically sets up the access ~~relationships~~routes prior to the failure in the new switch and then reconfigures the access ~~relationships~~routes.

14.   (CURRENTLY AMENDED) The storage area network system as in claim 9, wherein when the storage device side fiber channel adapter is replaced and the fiber channel adapter settings information is changed, the integrated management mechanism detects this and notifies ~~the~~a system administrator, and ~~if the system administrator issues~~upon receipt of a reconfigure command from the system administrator, the storage management mechanism passes along ~~the~~new settings information to the integrated management mechanism and the integrated management mechanism uses that new settings information to reconfigure the access ~~relationships~~paths so that the access ~~relationships~~paths are equivalent to the access ~~relationships~~paths prior to the replacement and then re-configures the access ~~relationships~~paths of the storage area network management mechanism and the region management mechanism.

15.   (CURRENTLY AMENDED) A storage area network (SAN) system comprising:
host computers, each comprising a storage area network management mechanism;
storage devices, each comprising a storage management mechanism;
switches, each having a region setting mechanism, interconnecting the host computers and the storage devices; and
an integrated management mechanism ~~integrating and controlling~~to integrate and control the ~~storage area network and comprising~~SAN according to a process comprising:
obtaining access path information of the host computers and the storage devices,

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setting up a storage affinity for each host, a switch zoning affinity for each switch, and a host affinity for each storage device, as a SAN configuration setting information based on said obtained access path information,

~~wherein using said access path information, the integrated management mechanism~~ transmitting access management information to the storage devices and to the storage area network management mechanism of the host computers, based upon the set storage affinity for a host computer,

transmitting region information to the region-setting mechanisms of the switches, based upon the set switch zoning affinity, ~~and~~

transmitting access restriction information concerning the host computers to the storage management mechanisms of the storage devices, based upon the set host affinity for a storage device,

wherein when the ~~storage area network management system~~SAN is started up and the access path information has not been set up, the integrated management mechanism first sets up the region-setting mechanisms of the switches so that no access is permitted and, after that, the integrated management mechanism sets up regions on the regions setting mechanisms of the switches.

16.   (CURRENTLY AMENDED) A storage area network (SAN) system comprising:

host computers, each comprising a storage area network management mechanism;

storage devices, each comprising a storage management mechanism;

switches, each having a region setting mechanism, interconnecting the host computers and the storage devices; and

an integrated management mechanism ~~integrating and controlling~~to integrate and control the ~~storage area network and~~according to a process comprising:

obtaining access path information of the host computers and the storage devices,

setting up a storage affinity for each host, a switch zoning affinity for each switch, and a host affinity for each storage device, as a SAN configuration setting information based on said obtained access path information,

~~and, using said access path information, said integrated management mechanism~~ transmitting access management information to the storage devices and to the storage area network management mechanisms of the host computers, based upon the set storage affinity for a host computer,

transmitting region information to the region-setting mechanisms of the switches, based upon the set switch zoning affinity, and

transmitting access restriction information concerning the host computers to the storage management mechanisms of the storage devices,

wherein the integrated management mechanism establishing specified fiber channel transfer classes using the storage area network management mechanism of the host computers whose access information has been set up, and the storage management mechanism of the storage devices, such that the host bus adapters of the host computers and the fiber channel adapters of the storage devices operate using the same transfer class.

17.   (CURRENTLY AMENDED) A storage area network (SAN) system comprising:

host computers, each comprising a storage area network management mechanism;

storage devices, each comprising a storage management mechanism;

switches, each having a region setting mechanism, interconnecting the host computers and the storage devices; and

an integrated management mechanism integrating and controllingto integrate and control the storage area network andSAN according to a process comprising:

obtaining access path information of the host computers and the storage devices and,

setting up a storage affinity for each host, a switch zoning affinity for each switch, and a host affinity for each storage device, as a SAN configuration setting information based on said obtained access path information,

using said access path information, the integrated management mechanism sends out

transmitting access management information to the storage devices and to the storage area network management mechanisms of the host computers, based upon the set storage affinity for a host computer,

transmitting region information to the region-setting mechanisms of the switches, based upon the set switch zoning affinity, and

transmitting access restriction information concerning the above host computers to the storage management mechanisms of the storage devices, based upon the set host affinity for a storage device,

wherein when a problem occurs in the storage area network systemSAN, the integrated management mechanism receives problem information and, for a specified period of time, waits to see if there are other problem reports by checking problem reports received during the

specified period and investigating relationship between the received problem reports and the problem report received first, and if the integrated management mechanism determines that the received problem reports and the problem report first received are related, the integrated management mechanism transmits a single report concerning one affected area according to a problem report method definition set up in advance in the integrated management mechanism.

18.   (ORIGINAL) The storage area network system as in claim 17, wherein the storage area network system presents related problem reports that the storage area network system receives as related problems in addition to the single problem area.

19.   (CURRENTLY AMENDED) The storage area network system as in claim 17, wherein in addition to the ~~settings information for the~~ access ~~paths~~path information, the integrated management mechanism also obtains and stores host-side logical volume information used in the access paths from the ~~computer~~storage area network management ~~mechanism~~mechanisms of the host computers, and

wherein when there is a report of a problem from within the storage area network, said access paths are used to read in the logical volume based on the access path information using said problem area, and report on the logical volumes that are affected by the problem.

20.   (CURRENTLY AMENDED) A method of integrating and controlling a storage area network (SAN) system, comprising:

~~managing, including receiving and/or transmitting, by~~providing an integrated ~~management mechanism~~, manager to manage access relationships, which comprises access management information, region information, or access limit information, between host computers of the ~~storage area network~~SAN and storage devices of the ~~storage area network~~SAN, wherein a switch connects the host computers and the storage devices;

obtaining by the integrated manager access route information of the host computers and the storage devices;

setting, by the integrated manager, a storage affinity for each host, a switch zoning affinity for each switch, and a host affinity for each storage device, as a SAN configuration setting information based on said obtained access route information;

transmitting, by the integrated manager, the access management information to the storage devices and to the host computers, based upon the set storage affinity for a host

computer;

transmitting, by the integrated manager, the region information to the switches, based upon the set switch zoning affinity; and

transmitting, by the integrated manager, the access limit information concerning the host computers to the storage devices, based upon the set host affinity for a storage device.

21.   (CURRENTLY AMENDED) The method as in according to claim 20, further comprising: establishing wherein the access relationships comprises establishing access paths between the host computers and the storage devices, said access paths being established and controlled by the integrated management mechanism manager.

22.   (CURRENTLY AMENDED) The method as in according to claim 21, further comprising: controlling by the integrated management mechanism wherein the access paths control access to regions of the storage devices by the host computers.

23.   (CANCELLED)

24.   (CANCELLED)

25.   (CANCELLED)

26.   (CURRENTLY AMENDED) The method as in according to claim 20, wherein the integrated management mechanism integrates related, reported further comprises, integrating, by the integrated manager, related problems into a single problem report.

27.   (CURRENTLY AMENDED) The method of claim 20, wherein the access relationships comprise any combinations of one or more of the access route management information for the storage devices and for the host computers, the region information for the switch, or the access restriction information for the host computers and for the storage devices.